Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Office of Engineering and Technology and Wireless Telecommunications Bureau Seek Comment on 5GAA Petition for Waiver to Allow Deployment of Cellular Vehicle-to-Everything (C-V2X) Technology in the 5.9 GHz Band	))))))	GN Docket No. 18-357

COMMENTS OF PANASONIC CORPORATION OF NORTH AMERICA

I. INTRODUCTION AND SUMMARY

Panasonic Corporation of North America[1] ("Panasonic") provides these comments in response to the above-captioned Federal Communications Commission ("FCC" or "Commission") Public Notice ("PN") seeking comment on the 5G Automotive Association ("5GAA") Petition for Waiver ("Petition") to allow deployment of Cellular Vehicle-to-Everything ("C-V2X") technology within the upper 20 MHz of the 5.850-5.925 GHz ("5.9 GHz") band.[2] Panasonic, an industry leader in Dedicated Short-Range Communications ("DSRC"), C-V2X, and other connected vehicle technology, continues to deploy innovative vehicle safety and connected highway solutions in 5.9 GHz spectrum with enormous lifesaving potential.[3]

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[1] Panasonic Corporation of North America is a leading technology partner and integrator to businesses, government agencies and consumers across the region. The company is the principal North American subsidiary of Osaka, Japan-based Panasonic Corporation and leverages its strengths in Immersive Entertainment, Sustainable Energy, Integrated Supply Chains and Mobility Solutions to enable its business-to-business customers. For more about Panasonic V2X technology, visit: https://na.panasonic.com/us/intelligent-transportation

[2] Office of Engineering and Technology and Wireless Telecommunications Bureau Seek Comment on 5GAA Petition for Waiver to Allow Deployment of Cellular Vehicle-to-Everything (C-V2X) Technology in the 5.9 GHz Band, Public Notice, DA 18-1231 (rel. Dec. 6, 2018) ("PN" or "Public Notice").

[3] DSRC and C-V2X will be referenced herein, collectively, as "V2X". V2X includes vehicle-to-vehicle ("V2V"), vehicle-to-infrastructure ("V2I")/vehicle-to-network ("V2N") and vehicle-to-pedestrian ("V2P") communications.

V2X solutions make roads safer and reduce carbon dioxide emissions and traffic congestion. In 2017, the United States suffered 40,000 traffic-related deaths to go along with three billion wasted gallons of fuel and 6.9 billion hours spent in traffic. The public will benefit from innovative technologies that address these public safety, environmental and economic issues. And deployment of V2X services is a critical step in the progression to higher levels of vehicle autonomy. According to the U.S. Department of Transportation ("DOT"), "[c]ooperative automation allows automated vehicles to communicate with other vehicles and the infrastructure to coordinate movements and increase efficiency and safety."[4]

Panasonic believes the Petition's desire to use the upper 20 MHz of the 5.9 GHz band for C-V2X to enable direct, peer-to-peer ("P2P") mode communications, such as V2V, V2P and V2I, will provide an opportunity for government and industry to observe the benefits and performance of C-V2X in real-world environments and to maximize the value of Intelligent Transportation Solutions ("ITS") spectrum. Accordingly, Panasonic supports the innovative uses of the 5.9 GHz band proposed by the Petition, so long as existing DSRC functionality is not impeded.

II. PANASONIC, A LEADER IN V2X TECHNOLOGIES, HAS DEPLOYED BOTH C-V2X AND DSRC

Panasonic is a leading Tier 1 supplier of automotive infotainment and vehicle components. Panasonic has many years of experience with V2X technologies and the capability to provide both DSRC and C-V2X communications components for Original Equipment Manufacturer vehicles.

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[4] U.S. Dept. of Transportation, *Automated Vehicles 3.0: Preparing for the Future of Transportation*, at 13, 16 (Oct. 4, 2018), *available at* https://www.transportation.gov/av/3; *see also id.*, at 16 (providing additional examples of cooperative automation applications).

The public interest benefit of these technologies and systems is compelling. Vehicle-connected roads are expected to reduce travel times by almost half, and vehicle-to-vehicle communication has the potential to eliminate 89% of Light Vehicle to Light Vehicle crashes and 85% of their associated economic costs.[5] Indeed, the National Highway Transportation Safety Administration ("NTHSA") estimated that by 2051, implementing V2V could prevent almost 600,000 crashes and reduce the costs resulting from these crashes by $53-$71 billion.[6] 5GAA has prepared a study suggesting that improved non-line-of-site and other performance factors may increase these benefits still further and estimates "thousands more lives could be saved and tens of thousands – if not hundreds of thousands – of serious injuries [could be] avoided."[7]

V2X technology can also promote transportation efficiencies, improve traffic flows, and reduce road congestion.[8] According to the Maryland Department of Transportation, in that state alone, "[t]he statewide cost of congestion based on auto delay, truck delay and wasted fuel and increased emissions was a staggering $2.11 billion in 2016, and it continues to grow."[9] V2X can enable greater cost- and fuel-efficiencies, such as truck platooning, which benefits interstate

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5 U.S. Department of Transportation, National Highway Traffic Safety Administration, *Federal Motor Vehicle Safety Standards: V2V Communications*, Notice of Proposed Rulemaking, 82 Fed. Reg. 3854, 3863 (Jan. 12, 2017) ("V2V NPRM").

6 *Id.*, at 3858.

7 5GAA, Petition for Waiver, GN Docket No. 18-357, at 14 (filed Nov. 21, 2018) ("5GAA Petition").

8 *See* Maryland Department of Transportation (MDOT) Comments, ET Docket No. 13-49 (filed Nov. 26, 2018).

9 *Id.* at 1.

commerce overall and the environment.[10] Platoons are predicted to reduce carbon dioxide levels up to 16 percent from trailing vehicles and up to eight percent from the lead vehicle.[11]

To take advantage of these profound safety enhancements, numerous states, local agencies, and cities around the country have launched traffic safety programs which rely on these technologies and systems.[12] For instance, the DOT recently awarded a $20 million BUILD Transportation Grant to Colorado to "create a commercial-scale connected vehicle environment using [V2X] technology."[13] The project "will send safety and mobility-critical messages directly to drivers through infrastructure-to-vehicle (I2V) communication as well as notify CDOT of crashes or hazards on the road through [V2I] communication."[14]

Panasonic continues to invest in vehicle connectivity solutions that improve driver and pedestrian safety and save lives. For instance, in August 2018, Panasonic teamed with Ford and Qualcomm to begin the first large-scale implementation of C-V2X technology. This project connects vehicles and roadways with a regional traffic management center in Denver, enabling a new level of data-driven situational awareness to roadway operators that will enable a dramatic

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10 *See* American Trucking Associations, Inc. Comments, ET Docket No. 13-49, 2 (filed Nov. 28, 2018) ("Among the developments since 2016 is the rapid development of driver-assistive truck platooning enabled by DSRC technology. Truck platooning uses V2V communication to connect the active safety systems – braking, acceleration, and in some cases steering between trucks – allowing them to travel closer together than would otherwise be possible for aerodynamic fuel efficiency.").

11 APTIV, *Platooning: Driving the Safety of the Commercial Fleet* (Sep. 12, 2018), *available at* https://bit.ly/2SAGJVU.

12 *See* The Wall Street Journal, "NYC Cars to Talk to One Another Under Traffic-Safety Pilot Program," (Nov. 6, 2018); Letter from Kirk. T. Steudle, Director, Michigan Department of Transportation, to Marlene H. Dortch, Secretary, FCC, ET Docket No. 13-49, at 2 (May 24, 2018).

13 U.S. Transportation Secretary Elaine L. Chao Announces $1.5 Billion in BUILD Transportation Grants to Revitalize Infrastructure Nationwide, Transportation.gov (Dec. 11, 2018), *available at* https://bit.ly/2zSzcKS.

14 *Id.*

improvement of driver safety on the road.[15] And in November 2018, Panasonic began the industry's first deployment of dual DSRC/C-V2X roadside units in Colorado.[16] Panasonic is in the process of installing 100 RSUs on I-70 which support both IEEE 802.11p™ DSRC and 3GPP C-V2X (PC5 Mode 4) wireless communication for ITS applications. Panasonic conducted this deployment under an experimental license for statewide deployment in Colorado, and it provides an indication of how quickly real-world deployment can be realized once the Commission provides regulatory certainty that C-V2X can be utilized.

III. V2X TECHNOLOGIES CAN SAVE AMERICAN LIVES AND PROVIDE SIGNIFICANT SAFETY BENEFITS

V2X technologies for transportation and vehicle safety applications hold enormous potential to save American lives and enable the deployment of an "internet of roads" to improve the efficiency of transportation infrastructure. The internet of roads will allow drivers and traffic managers to receive real-time information about road conditions such as traffic delays, icy conditions, and crashes through continuous and automatic communications between individual vehicles and roadside infrastructure. Traffic managers could send messages to connected vehicles via roadside units ("RSUs"), alerting drivers to upcoming roadway hazards—such as a crash or closure ahead—on in-vehicle screens.[17]

Panasonic's traffic management innovation also extends to Cirrus, a solution for transportation agencies unveiled during the September 2018 ITS World Congress in Copenhagen, Denmark. Cirrus is a smart transportation ecosystem platform that provides cloud

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15 Press Release, *Panasonic, Qualcomm and Ford Demo the First Real-World Application of C-V2X in Colorado*, Panasonic.com (Aug. 15, 2018), *available at* https://bit.ly/2S7C79n.

16 *See* Exhibit 1, a photo of the first unit installed on I-70 on Nov. 14, 2018.

17 *See* CDOT and Panasonic Take First Steps to Turn I-70 into Connected Roadway, CODOT.gov (July 26, 2018), *available at* https://bit.ly/2qT0f3P.

analytics data processing, real-time analysis and transmission, and data storage capabilities for sharing and updating vehicles and municipalities with road conditions, operations and other safety information.[18] An open development platform for data sharing and collaboration, Cirrus was developed using industry V2X standards, supports integration to existing transportation systems, and works with either C-V2X or DSRC communication protocols used to transmit data from vehicles to RSUs. Cirrus has been deployed in Colorado and Panasonic has been awarded a contract by the State of Utah to deploy the Cirrus platform there as well.

The Cirrus platform provides a bridge to share important data between state DOT operation centers and vehicle information systems. An Internet of Things application program interface layer serves as the platform's foundation for state DOTs to utilize V2X as a data source for sensing roadway conditions in real-time. Cirrus has an open specification API for V2X data collection and dissemination, while managing the input and output of significant vehicle data throughput from and to connected vehicles. Cirrus uses Cloud Analytics to filter, translate, and deliver all incoming V2X data into real-time, actionable information. The data is sorted for immediate action, aggregation, analytics, or storage depending on the functionality and business needs of DOT. Cirrus's Cloud Analytics also encompasses network management, systems performance and system security capabilities. Cirrus also includes Edge Analytics capabilities in the event of a Cloud Analytics service disruption. Using Cirrus, roadway operators receive transportation data that can trigger immediate deployment of first responders during emergency conditions or optimize traffic flows in real time.

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[18] *Panasonic Unveils 'Cirrus' V2X Traffic Management Solution at ITS World Congress Copenhagen*, Press Release, Panasonic.com (Aug. 15, 2018), *available at*: https://bit.ly/2S4Uf3o.

Together, these innovations demonstrate Panasonic's commitment to the lifesaving potential of V2X in a dedicated 5.9 GHz band.

IV. THE FCC SHOULD ADOPT A TECHNOLOGY-NEUTRAL APPROACH IN THE 5.9 GHZ BAND THAT DOES NOT IMPEDE THE FUNCTIONALITY OF DSRC

Panasonic has a long history of technology development focused on DSRC, but it is also working with industry partners to explore emerging C-V2X capabilities. Panasonic also follows DSRC advances in the IEEE 802.11 "Next Generation V2X" study group, which is expected to amend the 802.11p standard. The evolution of both standards-based technologies portends promising future developments. The development of C-V2X and DSRC help accelerate the innovation the U.S. needs to address vehicle safety and highway capacity limits.

For these reasons, Panasonic prefers to remain technology neutral relative to communications protocols that support V2X technology. Therefore, Panasonic agrees with National Highway Transportation Safety Administration ("NHTSA") Deputy Administrator Heidi King that:

> "The market will eventually sort out which of these may be the preferred solution for V2X communications, or even if they might exist side-by-side while supporting varying transportation applications. The [DOT] sees great advantages in having spectrum available to allow these technologies to mature — and, avoiding policies that would force a premature, or less-considered, decision on technologies. . . . [W]e are at a point in time with the rollout of V2X connectivity that is not unlike when Wi-Fi entered the marketplace at 2.4 GHz more than 20 years ago. It would have been impossible to predict the exact applications and services that would develop, or the magnitude of their deployment. Yet develop they did, and the Wi-Fi industry is now looking for more bandwidth and spectrum to serve a market that would have been impossible to predict 20 years ago. Just like Wi-Fi growth and development, there is a near certainty that innovative transportation applications designed to leverage V2X's unique attributes will develop, and they will need spectrum to work effectively. Further, as many of you know, device-to-device communications technologies themselves are improving and changing at a fast pace — including continued advancements in

DSRC as well as emerging C-V2X and even all-new 5G protocols to support high-performance, direct communications between devices."[19]

A technology neutral approach will serve the public interest. For this reason, Panasonic supports the use of 20 MHz for C-V2X in the upper portion of the 5.9 GHz band. To prevent impeding the current functionality of DSRC in other portions of the 5.9 GHz band, it is appropriate for the Commission to consider reasonable technical measures to prevent harmful interference between C-V2X and DSRC. Panasonic believes that the proposed waiver conditions set forth in Appendix D of the Petition are adequate interference protection "for the introduction of C-V2X services... [and] ensure that C-V2X deployment under the requested relief should have no significant impact on any existing DSRC operations in the band."[20] Panasonic supports the use of 20 MHz for C-V2X in the upper portion of the 5.9 GHz band to enable direct, P2P mode communications such as V2V, V2P and V2I using 3GPP C-V2X (PC5 Mode 4) for ITS applications. Panasonic believes that 20 MHz will be adequate for this C-V2X technology to be used at scale and deployed in real-world situations, and it accepts 5GAA's analysis that C-V2X can be operated without "increasing any risk of interference to other authorized users of the band."[21]

V. CONCLUSION

For the reasons described above, Panasonic agrees with 5GAA that waiver grant would "help to further the vision of ITS in the 5.9 GHz band and respond to the societal needs that Congress, the Commission, DOT, and NHTSA repeatedly have identified over the better part of

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[19] Heidi King, Deputy Administrator, NHTSA, *Prepared Keynote Remarks at the International Symposium on Advanced Radio Technologies 2018 Conference*, NHTSA.gov (July 25, 2018), *available at* https://bit.ly/2StcKPy.

[20] 5GAA Petition, at 21.

[21] *Id.*, at 31.

the past three decades."[22] So long as it does not impede the functionality of DSRC in other portions of the 5.9 GHz band, the roadway safety benefits of granting a waiver for C-V2X would serve the public interest.

V2X technologies in the 5.9 GHz band hold enormous potential to reduce traffic accidents, save American lives, and address traffic congestion that wastes resources. Panasonic encourages the Commission to approve the 5GAA waiver to allow further innovation in V2X technologies.

Respectfully submitted,

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[22] *Id.*, at 25.

EXHIBIT 1